Tab 1

Q.1 Discuss communicable diseases under the following headings:

Definition

Causative agents

Modes of transmission

Methods of prevention and control.

Definition

Communicable diseases are illnesses caused by infectious agents (such as bacteria, viruses, fungi, or parasites) that can be transmitted from one person, animal, or object to another. They are also known as infectious or transmissible diseases and can spread directly (through contact with an infected person) or indirectly (through contaminated food, water, air, or vectors like mosquitoes).

Causative Agent

Communicable diseases are caused by pathogenic microorganisms, including:

1.Bacteria: e.g., Mycobacterium tuberculosis (Tuberculosis)

2.Viruses: e.g., HIV (AIDS), Influenza virus (Flu)

3.Fungi: e.g., Candida albicans (Candidiasis)

4.Protozoa (Parasites) e.g., Plasmodium spp. (Malaria)

5.Helminths (Worms) e.g., Ascaris lumbricoides (Ascariasis)

Modes of Transmission

Communicable diseases spread through several routes:

1. Direct Transmission

_Person-to-person contact (e.g., touching, kissing, sexual contact)

_Droplet infection (e.g., coughing, sneezing — influenza, COVID-19)

2. Indirect Transmission

_Airborne transmission (tiny droplets that remain suspended e.g., measles, TB)

_Vector-borne transmission (via insects like mosquitoes e.g., malaria, dengue)

_Fecal-oral route (through contaminated food or water e.g., cholera, typhoid)

_Fomite transmission (through contaminated objects e.g., towels, utensils)

_Bloodborne transmission (through blood transfusion or shared needles e.g., HIV, hepatitis B)

Methods of Prevention and Control

A. Personal and Community Hygiene

Regular hand washing with soap and water

Proper sanitation and waste disposal

Safe food handling and clean drinking water

B. Immunization

Vaccination against diseases like measles, polio, hepatitis B, and COVID-19

C. Vector Control

Use of insecticide-treated mosquito nets

Eliminating stagnant water and breeding sites

D. Isolation and Quarantine

Isolating infected individuals to prevent spread

Quarantining contacts during outbreaks

E. Health Education

Creating awareness on modes of transmission and preventive practices

F. Prompt Diagnosis and Treatment

Early detection and appropriate medical treatment to reduce infectivity.

Q.2 Explain the terms endemic, epidemic and pandemic and give examples.

Endemic:

An endemic disease is one that is constantly present within a specific geographic area or population. It occurs at a predictable and steady rate over time.

Example:

★ Malaria is endemic in many parts of West Africa.

★ Common cold is endemic worldwide.

Epidemic:

An epidemic occurs when there is a sudden increase in the number of cases of a disease above the normal expected level in a particular area or population.

Example:

★ The Ebola outbreak in West Africa (2014–2016) was an epidemic.

★ A sudden measles outbreak in a city is also an epidemic.

Pandemic:

A pandemic is an epidemic that spreads across countries or continents, affecting a large number of people worldwide.

Example:

★ The COVID-19 pandemic (2019–present) affected countries across the globe.

★ The Influenza pandemic of 1918 (Spanish Flu) was another major example.

Q.3 Define and distinguish between incidence and prevalence. Explain their importance on epidemiology with examples.

Incidence:

Incidence refers to the number of new cases of a disease that occur in a specific population during a defined period of time.
It shows how quickly new cases of a disease are developing.

Example:

If 50 new cases of malaria occur in a community of 1,000 people within one year, the incidence rate is 50 per 1,000 per year.

Prevalence:

Prevalence refers to the total number of existing cases (both new and old) of a disease in a population at a specific point or period in time.
It shows how widespread a disease is.

Example:
If 200 people in a population of 1,000 currently have diabetes (whether newly diagnosed or not), the prevalence is 200 per 1,000.

Distinction between Incidence and Prevalence

Meaning

Incidence: Measures new cases   Prevalence: Measures all existing cases

Time Frame

Incidence: Over a period of time   Prevalence: At a point or period of time

Purpose

Incidence: Indicates risk of developing the disease
Prevalence: Indicates burden of the disease

Affected by

Incidence: Rate of new casesBoth incidence and duration of disease

Useful for

Incidence: Studying causes and risk factors
Prevalence: Planning health services and resource allocation.

Importance in Epidemiology

1. Incidence helps identify:

Causes and risk factors of disease (useful in analytical studies).

Effectiveness of preventive measures — e.g., a decrease in HIV incidence after a health campaign shows success in prevention.

2. Prevalence helps determine:

Overall disease burden in a community.

Resource and service needs — e.g., high prevalence of diabetes means more long-term care facilities and medications are required.

Example in Epidemiology

For HIV/AIDS:

Incidence shows how many new infections occur yearly (helps track transmission rate).

Prevalence shows the total number of people living with HIV, helping plan ongoing treatment and support programs.

Q.4 Describe the measures used in controlling communicable diseases at the community level.

Measures used in controlling communicable diseases at the community level are a combination of preventive, promotive, and control strategies aimed at reducing transmission, morbidity, and mortality. These measures can be grouped into several categories:

1. Health Education and Community Awareness

Purpose: To inform and educate people about causes, modes of transmission, and prevention of communicable diseases.

Examples:

Teaching about handwashing, safe food handling, and personal hygiene.

Public campaigns on the importance of immunization and sanitation.

Promoting safe sexual practices to prevent HIV and other STIs.

2. Immunization Programs

Purpose: To provide immunity to individuals and reduce disease spread in the population.

Examples:

Routine immunization against diseases like measles, polio, diphtheria, and tuberculosis.

Mass vaccination campaigns during outbreaks.

3. Environmental Sanitation

Purpose: To eliminate or reduce environmental factors that facilitate disease transmission.

Examples:

Proper disposal of waste and sewage.

Provision of clean and safe drinking water.

Control of vectors such as mosquitoes, flies, and rodents.

Ensuring food hygiene and safe housing conditions.

4. Surveillance and Early Detection

Purpose: To monitor disease occurrence and detect outbreaks early for prompt response.

Examples:

Reporting of notifiable diseases to health authorities.

Community health workers identifying and reporting suspected cases.

Epidemiological surveillance systems for tracking disease trends.

5. Isolation, Quarantine, and Treatment

Purpose: To prevent the spread of infection from infected individuals to healthy ones.

Examples:

Isolating patients with contagious diseases (e.g., tuberculosis).

Quarantining contacts of infectious cases (e.g., during Ebola or COVID-19 outbreaks).

Providing effective treatment to infected persons to eliminate sources of infection.

6. Vector and Reservoir Control

Purpose: To reduce or eliminate carriers of disease agents.

Examples:

Insecticide spraying and use of mosquito nets to prevent malaria.

Eliminating stagnant water to prevent mosquito breeding.

Controlling stray animals and rodents that may carry diseases.

7. Improved Nutrition and General Health Promotion

Purpose: To strengthen immunity and resistance against infections.

Examples:

Encouraging balanced diets, breastfeeding, and micronutrient supplementation.

Promoting physical activity and healthy lifestyles.

8. Legislation and Policy Measures

Purpose: To enforce public health laws that prevent disease spread.

Examples:

Mandatory reporting of infectious diseases.

Regulations on food hygiene and waste disposal.

Enforcing school-entry immunization requirements.

Q.5 Write short notes on the following:

a. Epidemiology triangle

b. Vehicle-borne transmission

c. Point prevalence and period prevalence

A. Epidemiologic Triangle

The epidemiologic triangle is a model used to explain how infectious diseases occur and spread.

It consists of three components:

1. Agent – The microorganism or pathogen that causes the disease (e.g., bacteria, virus, parasite).

2. Host – The organism (usually a human or animal) that harbors the disease. Factors like age, immunity, and nutrition influence susceptibility.

3. Environment – The external factors that allow the disease to be transmitted, such as climate, sanitation, and living conditions.

Interaction among the agent, host, and environment determines whether disease occurs.

Example: In malaria, the Plasmodium parasite (agent), human (host), and mosquitoes and stagnant water (environment) interact to sustain transmission.

B. Vehicle-Borne Transmission

Definition: Transmission of infectious agents through inanimate objects or materials (vehicles) that carry pathogens to a new host.

Examples of vehicles: Food, water, blood, fomites (e.g., utensils, clothing, medical instruments).

Mechanism: Pathogens contaminate the vehicle → vehicle is ingested, injected, or comes into contact with mucous membranes → infection occurs.

Examples:

Cholera from contaminated water.

Hepatitis B from contaminated blood transfusions.

Food poisoning from contaminated meals.

C. Point Prevalence and Period Prevalence

Both measure how widespread a disease is within a population.

1. Point Prevalence:

The proportion of individuals with a disease at a specific point in time.

2. Period Prevalence:

The proportion of individuals who have had the disease at any time during a specified period (e.g., a month or a year).

Includes both existing and new cases within that time frame.

Example: The number of people who had malaria at any time during the year 2024.